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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 112

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AUSTRALIA

URANIUM BOOM FORESEEN IN ALLIGATOR RIVER AREA

Aboriginal Claim Rejection

Canberra THE AUSTRALIAN in English 23 Jul 81 p 1

[Article by Geoff Sorby and Bruce Jacques: "Judge Paves Way for Uranium Boom"]

[Excerpt] A judge has given a green light for the development of the world's largest deposits of uranium in the South Alligator River area of Arnhem Land.

In a report on Aboriginal land rights to be published today, Mr Justice Toohey, the Federal Government's Aboriginal land commissioner, rejects 90 per cent of Aboriginal claims for the Alligator River area of the Northern Territory, including the Kakadu State Park.

The judge's report provides a major boost for the mining industry. But it is a setback to Aboriginal aspirations in the area.

The judge's recommendations have to be ratified by the Federal Government.

But if the go-ahead is given in two months' time, the major company involved, Pancontinental Mines, is confident that uranium mining will begin in 1985.

A major political row is certain because of the ACTU's and the ALP's opposition to uranium developments.

Pancontinental is now pressing ahead with multi-million dollar compensation arrangements with Aboriginal tribes in the area.

Jabiluka Timetable

Sydney THE SYDNEY MORNING HERALD in English 23 Jul 81 p 25

[Article by David Wheeler: "Delays Could Close the US Window for Jabiluka"]

[Excerpts] Any delays in getting Pancontinental Mining's $500 million Jabiluka uranium project off the ground could result in the company losing a prime opportunity to clinch a strong position in the US uranium market.

At present, US producers are cutting production in the face of rising costs and weakening uranium prices. Mines in Wyoming and Mexico have closed down. Utilities are selling off their stocks.

The result, says Pancontinental's chairman, Mr Tony Grey, is that a "window" will open in the US market which Jabiluka, hopefully, can enter.

"But if we don't get it going soon then I fear the opportunity will be lost to our major competitor--Saskatchewan--and the window will close," he said.

Pancontinental has high hopes of finalising negotiation with Aboriginal leaders and to go ahead with the project by early next year.

Jabiluka is 65 per cent owned by Pancontinental and 35 per cent owned by Getty Oil. Under foreign investment guidelines, Getty will be required to sell 10 per cent of its holding to Australian interests before production starts.

Pancontinental has already secured some customers for the 65 per cent of production it will be responsible for marketing.

"We have spent the past five years talking with nuclear utilities around the world, and many of them have now reserved tonnages for purchase from Jabiluka," Mr Grey said.

"We expect the major proportion of sales will go to Europe, with the remainder to South East Asia and the US.

"Despite the weak market, which is due to a general slow-down of nuclear programs around the world, and licensing problems in the US, we managed to convince buyers of the tremendous strategic advantages Jabiluka offers.

"First, it is a large deposit. Second, it is of high grade. These two factors combine to give the project a lower cost spectrum.

"Third it is located in a politically stable country.

"The Reagan Administration is opening the way to easier development of nuclear power plants. But the main thing which will revive the market will be economic recovery in the US."

CSO: 5100/7551

URANIUM ENRICHMENT INDUSTRY PREDICTED FOR SOUTH

Canberra THE AUSTRALIAN in English 16 Jul 81 p 36

[Article by Wio Joustra: "Enrichment Industry Here 'By End of Decade'"

[Text] Australia will have a uranium enrichment plant before the end of the decade, according to the technical director of the Australian Mineral Development Laboratories, Mr Ron Wilmshurst.

Mr Wilmhurst, an adviser to the South Australian Government, told a National Science Forum luncheon in Canberra yesterday South Australia would be the best place to build the enrichment plant.

The gas centrifuge process developed by the British-Dutch-German owned Urenco Centec group would be the best process for the Australian plant, as the diffusion process would be phased out in the next two decades, he said.

"The Australian plant will be the only one in the world totally funded and operated by private enterprise," he said.

He predicted a change in market conditions in the near future from the depression to enrichment production on a large scale.

"Before the end of the century Australia will be a major supplier of enriched uranium to an expanding world enrichment industry," he said.

Mr Wilmshurst said an enrichment industry in Australia would be desirable on the grounds of economy and nonproliferation.

It would also be a worthwhile addition to the direction of further processing of Australia's minerals.

"In terms of added value, depending on yellowcake prices, conversion to uranium hexafluoride may add 10 per cent and enrichment a further 100 per cent to the value of our uranium," he said.

"There are therefore excellent economic reasons for the establishment of an enrichment industry in Australia."

He said South Australia was the frontrunner for the plant because it had:

--The appropriate industrial support.
--Available energy.
--It was centrally located to supplies of yellow cake.
--It had adequate industrial land available with appropriate infrastructure already in place.

Mr Wilmshurst said the feasibility study by the Uranium Enrichment Group of Australia--a consortium comprising Peko-Wallsend, BHP, CSR and Western Mining--would be completed in 2-1/2 years at a cost of $5 million.

The appropriate technology would be selected within six months and a further economic feasibility study of an enrichment industry would take another two years.

CSO: 5100/7551

BRIEFS

MORE ACTU ANTI-NUCLEAR ACTION--Adelaide--A container ship was prevented from entering Adelaide Harbour yesterday for 24 hours because it had defied an ACTU ban last year and transported uranium yellow cake from Brisbane to Canada. The Seamen's Union refused to supply a tug to bring the foreign owned Paralla into harbour until early today. The Paralla, which is at present carrying only general container cargo, has been at anchor in the outer harbour since early yesterday morning. A Federated Miscellaneous Workers' Union spokesman in Adelaide, Mr Danny Connor, said that in May the ship entered Brisbane harbour in the dark without the aid of tugs and loaded a shipment of uranium yellow cake which had been sitting in the Brisbane railway ground for 12 weeks because of the ACTU ban on its export. He said the present union action was being taken because the ship had violated the ACTU ban. [Text] [Sydney THE SYDNEY MORNING HERALD in English 13 Jul 81 p 2]

NUCLEAR WEAPONS CALL--Sections of the Liberal Party are pressing the Prime Minister, Mr Fraser, to rewrite defence policy and start planning for nuclear weapons. The demand for change has the full backing of the State Council of the party's West Australian branch, which has just sent a report to Mr Fraser arguing that the existing defence policy be scrapped. The report, released in Perth yesterday, claims that unless Australia doubles defence spending, its present state of "inertia" would leave the country "up for grabs." But one of its most controversial recommendations is on nuclear weaponry. It draws the line on Australia acquiring atomic bombs immediately, but says that at the first hint such weapons are being developed by other countries in the region, Australia should get its own. Meanwhile it says Australia should work towards reducing the considerable lead time needed to acquire the technology by "establishing an embryo on which to base the possible future requirement to produce nuclear weapons and the associated delivery system." The report says this would mean providing the money now for nuclear weapon planning, research, and development. "It is also a necessary corollary of this request that intelligence work in the region be given high priority so that the maximum possible warning is given of the nuclear ambitions and development of our neighbors," it says. [By Peter Terry] [Excerpt] [Canberra THE AUSTRALIAN in English 24 Uul 81 p 3]

CSO: 5100/7551

PHYSICIST JOSE GOLDEMBERG URGES NUCLEAR TIMETABLE RESTRUCTURING

Sao Paulo FOLHA DE SAO PAULO in Portuguese 26 Jul 81 p 33

[Excerpts from exclusive interview with physicist Jose Goldemberg by Paulo Marques; date and place not given]

[Text] In an exclusive interview with FOLHA, physicist Jose Goldemberg stated: "In order to make NUCLEP [NUCLEBRAS Heavy Equipment, Inc], the NUCLEBRAS company responsible for the manufacture of equipment for nuclear powerplants, viable, the government would have to construct one nuclear unit per year, which is absolutely impossible. And therefore, what needs a reform is not Brazil, but rather the NUCLEBRAS timetables."

According to Professor Goldemberg, the fundamental error in the program signed in 1975 by Brazil and the Federal Republic of Germany was to make the nuclear industry vertical in arrangement and to select enriched uranium as a fuel for the nuclear powerplants. Unlike countries such as India, Canada and Argentina, which opted for natural uranium, Brazil chose the most expensive and most complicated course of action. Hence, the lags in the program have stemmed from its own giant proportions.

Regarding the construction of the Peruibe nuclear powerplants, Goldemberg is of the opinion that, "There is no urgent need to begin the projects. Moreover, that is the opinion of the Sao Paulo government itself, and it seems to me to be a provocative maneuver to reopen the discussion of those Sao Paulo units. After all, they have no means of being started during the tenure of the present government."

Following are excerpts from the interview:

The Strategic Model of the Sector Is Unsuitable

FOLHA: How does the scientific community view the proposal from the chairman of the National Confederation of Industries (CNI), Albano Franco, to Minister Cesar Cals, indicating that the Ministry of Mines and Energy should slow down the construction of nuclear powerplants? Is Cals' argument, to the effect that the construction of a small number of plants would not develop nuclear technology and would not attract investors from the capital goods sector, a valid one?

Goldemberg: Well, the statements made by the chairman of the National Confederation of Industries lent support to a position already assumed by the scientists several years ago. They come from an important sector of Brazilian society, which has just come to realize that the strategy devised by the Geisel government for bringing Brazil into the nuclear area is inappropriate. What has been under discussion since 1975 is the model for the transfer of modern technologies to Brazil; not so much the nuclear energy, but the model that should be followed in introducing aerospace, computer and advanced metallurgical technology, and so forth. Nuclear energy enters into this context, because it is a productive technology; that is to say, the mastery of the nuclear sector demands a knowledge of several types of technology which are useful for other purposes. For example, it is impossible to have a nuclear industry without a well developed metallurgy, a well advanced welding technology and a strong electronic industry. At that time, what was believed perhaps with a certain degree of naivete was that the development of nuclear energy would be a dynamic factor for the nation's development. And what has happened with the model devised in 1975 is that a growing number of sectors are realizing that this was an unsuitable model. The last sector to realize this has been the National Confederation of Industries.

Minister Cesar Cals has argued in the press that the very size of the nuclear program is required to make the orders possible for industry; that, if the program were a program with only two nuclear reactors, it would not be attractive to industry. This means that the minister takes the NUCLEBRAS programs seriously. What he needs to do is modify the timetables, because nuclear industries as such exist in but few countries in the world. It would be difficult to find a nation in the world that has a NUCLEP, as Brazil does, which is a capital goods company engaged solely and exclusively in the production of nuclear components.

FOLHA: What is the fundamental impropriety in the program?

Goldemberg: The impropriety in the program consists of two parts: one, it is a technological choice that seems unsuitable to me; second, the manner in which it is to be implemented from an industrial standpoint. The improper technological choice was that of the policy of enriched uranium in a country such as Brazil, which could hardly become converted into a great nuclear power from the standpoint of the use of nuclear energy for peaceful purposes. The nations which started with modest nuclear programs began with natural uranium. This holds true even for France and England which, at the end of World War II, were unable to obtain enriched uranium, which was denied them by the United States. India, Canada and Argentina itself pursued the path of attempting to develop nuclear energy using natural uranium, which is a technology that demands a lesser volume of initial investment. With the passage of years, it is possible that the investment will end up being large, but the system using natural uranium is less vulnerable to outside pressure. And Brazil decided to start afresh, and become involved, from the outset, in a grandiose nuclear energy program. To make this program viable, it adopted a complicated technology based on the establishment of enrichment and reprocessing plants, and so on. A model of industrial transfer was established which entails the need for eight nuclear reactors. A program with enriched uranium of the type that Brazil devised is a program which does not lend itself to a change in scale; there is a minimal scale.

FOLHA: Minister of Mines and Energy Cesar Cals has mentioned the establishment of eight units. Do you agree with that number?

Goldemberg: No, I don't agree that eight should be the minimal number; but there is a minimal number. It could not be eight; it could be four, but it also could be two.

FOLHA: Four is the number cited most often. Does that make sense?

Goldemberg: This is what is mentioned in the Brazilian nuclear accord; in other words, the accord with Germany does not mention the need for a transfer of eight powerplants. But according to the established model the transfer of eight powerplants would create an adequate components market. Now this is a technocratic noction of the problem; because in 1975 that model was based on the assumption that things would remain unchanged for 15 or 20 years; that is to say, the Brazilian model of development would not meet with any obstacles until 1990. In other words, the only thing required to make it difficult to justify the construction of so many nuclear powerplants was the failure of Brazilian development to register the growth rates of the miracle era.

The idea which cropped up in 1975, of making the nuclear industry vertical, seems to me to have been the fundamental error in the industrial strategy. And we are caught in this straitjacket. In other words, NUCLEBRAS set up NUCLEP in record time, and now, to make NUCLEP viable, Brazil needs to build one nuclear powerplant per year; something which is completely impossible. This is what needs to be changed. What needs a reform in this case is not Brazil, but rather the NUCLEBRAS timetables. Minister Cesar Cals is wrong when he claims that four or eight reactors are required to make a nuclear industry viable. From every indication, the Argentine nuclear industry is reasonably viable with two. And there may be others. But the others will appear as the needs for generating electricity become clearly marked.

The Program May Be Buried By Delay

FOLHA: In terms of cost, how much would a natural uranium plant represent in comparison with an enriched uranium one?

Goldemberg: The fact is that this is a rather uncomplicated matter. The natural uranium reactors are simpler than those using enriched uranium, and they are not much larger. The capital cost of a nuclear unit producing electricity which uses natural uranium is about 10-15 percent more than that of an enriched uranium reactor. However, the production of electricity ends up being cheaper, because it does not burn enriched fossil material.

FOLHA: Making a parallel between an enriched uranium powerplant and a natural uranium plant, what would the price of the installed power be in a plant of the second type?

Goldemberg: It would be $1,200 per kilowatt if it were built exactly on time. Obviously, if the plant were a natural uranium one, and was also delayed 6 or 7 years, it would be the financial resources that would raise the price. Consider Angra 1, which is virtually ready. Furnas published data showing that nearly $300 million of the $1.4 billion represented financial costs. Moreover, there are problems involving loss of profits; that is, the fact that the plant is not in operation means that the owner has stopped billing. It is like Itaipu. If, instead of starting to operate in 1983, Itaipu were to begin operating in 1990, the cost per installed kilowatt at Itaipu would be extremely high, because we would have to start paying the cost of the turbines within a short time. Hence, the delays in the Brazilian nuclear program are the results of its own gigantic proportions. They are acting as a very heavy burden, tending to bury the program itself as a result of a disproportionate increase in prices.

FOLHA: It has been commented that you are negotiating with the federal government on the new model for the nuclear program. We have been told that the proposal included a suggestion for stoppage of the work on Angra 2 and 3 projects, not constructing the Peruibe powerplants, the creation of a research institute for the development of natural uranium reactors, the scheduling of new powerplants after 1990 and the adoption of more nationalization for Angra 2 and 3, through the current revision of Brazil's contract with Germany. What would you care to say about this?

Goldemberg: Since I was, until recently, the head of the Brazilian Society for the Advancement of Science (SBPC), all the proposals from the scientific community concerning this matter are attributed to me. It is not true that I submitted this list of measures to the government. About a month ago, I met with General Venturini, and I met with other authorities previously; but what I explained to the authorities is the position of the scientists.

Throughout recent years, the annual meetings of the SBPC and the Brazilian Physical Society have produced important documents, and I have been the spokesmen for these claims.

There Is No Urgent Need for the Peruibe Projects

FOLHA: Basically, what was proposed?

Goldemberg: The scientists' position is quite realistic. Until 1970, the unanimous view among scientists was that Brazil could easily achieve self-sufficiency in the nuclear area; that is, master the technology and continue with the work that was being done with the natural uranium reactors. This would place Brazil in the historical line with India, Canada and Argentina. It was the purchase of the Angra 1 reactor from the American firm Westinghouse that demobilized the national effort in that field. Now that 10 years have elapsed, we think that it would be difficult to turn the clock back and begin everything again. The plan to build a reactor with local resources would hardly attract the interest of the Brazilian scientists. I think that many of them feel that there are very great commitments to Germany, and that those commitments must be kept insofar as Angra 2 and 3 are concerned. But, since they are considerably delayed, it is time to reorganize the NUCLEBRAS timetables and establish a plan to assimulate the German technology which is a system benefiting national industry. From this standpoint, the scientists' position coincides with that of the chairman of the National Confederation of Industries. The orders which are negotiated with Germany and which will cost us foreign exchange should be renegotiated and redistributed among the national industry.

After Angra 2 and 3, it is our view that the horizon should be kept open. There is absolutely no urgent need to begin projects in Peruibe. Furthermore, there is every indication that this is the opinion of the Sao Paulo government itself, and it seems to me to be a provocative maneuver to reopen the discussion of Peruibe which, after all has no means of being started during this government.

FOLHA: Another comment made is that you are nurturing political ambitions. Is that true?

Goldemberg: Since 1970, I have held the position of chairman, regional secretary or vice-chairman of the Brazilian scientific associations and, recently, SBPC, which is the major Brazilian scientific association. And, owing to these offices that I have held, I have been put in contact with government authorities. I have never left Sao Paulo University, but this does not mean that my name has not been considered on occasion for public positions. Two years ago, when Minister Delfim Neto was appointed minister of planning, he invited me to assume the chairmanship of the National Research Council (CNPq). In the end, my appointment did not materialize at that time.

FOLHA: Was it you who did not accept?

Goldemberg: No. It was something more complicated than that. I really hesitated to accept because it would not be very easy for me to move to Brasilia. I didn't think that it would be very beneficial to my own professional activity. But the National Research Council would have been a major challenge at the time; and the idea, at the time, was to dynamize this council and really put it in the service of the development of Brazilian science. I wavered slightly and, just as I hesitated, the offer also underwent vacillation of its own. So I finally ended up not being named to that position. During this 2-year period I held the chairmanship of the SBPC, and, all things considered, I believe that it was an advantageous substitution.

Goldemberg defends a reform

2909
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BRAZIL

ITALY SIGNS ACCORD TO TRANSFER 'FAST-BREEDER' TECHNOLOGY

Rio de Janeiro GAZETA MERCANTIL in Portuguese 29 Jul 81 p 8

[Text] Today, Brazil has signed another nuclear accord, this time with Italy, to develop the technology for the rapid reactors, the so-called "fast-breeders" which consume plutonium. In Itamaraty, at 0930 hours, Prof Hervasio de Carvalho, chairman of the National Nuclear Energy Commission (CNEN), acting on behalf of Brazil, signed a government-level accord and a contract with the Italian firm, Italian Nuclear [Company] for Advanced Reactors (NIRA), for the sale of "sodium circuits" which will be operated by Brazilian technicians on the island of Fundao, in Rio de Janeiro. The price of the contract is $10.9 million.

This accord, which was negotiated during recent months, had been announced earlier by the minister of mines and energy, Cesar Cals; but the scientific, technical and industrial cooperation between the two countries in this nuclear field has been taking place since 1958, when the first accord was signed between the two governments. According to CNEN, in August 1971 a protocol was signed with the Italian National Nuclear Energy Commission, calling for, among other things, cooperation in the area of sodium technology applied to rapid reactors. The sodium is used as the cooling element for the rapid reactors, just as the light water is in the reactors purchased by Brazil from Germany. On behalf of Italy, the accord was signed by Umberto Colombo, chairman of the commission, and the contract was signed by engineer Giovanni Gambardella, president of NIRA.

During the 5-year duration of the accord, there will be training of Brazilian technicians in Italy, courses held in Brazil, training on the circuits to be supplied by NIRA and assistance for the installation of a "sodium storage unit." A text from CNEN explains that the purposes of the accord and the contract are that Italy will cooperate with Brazil in "the acquisition of basic information relating to experimental projects and groups dealing with liquid sodium, the gaining of the capacity to manage a sodium storage unit and to operate the sodium circuits independently, and the attainment of independence regarding experimental projects in the thermomechanical and thermohydraulic fields."

CNEN has been engaged in research in the area of rapid reactors on the island of Fundao since 1969, and constructed a sodium thermal circuit with a power of 100 kilowatts. According to the explanation from CNEN, its studies of the current international situation led the government to the conclusion that it was necessary to keep pace with the accelerated technological progress in the field. The commission claims that Italy's decision to become a partner in the acquisition of this information was a result of the fact that this country is in the "vanguard" for that process, both in terms of research and the industrial area. A consortium of Italian companies is constructing 40 percent of the equipment for the French Super-Phoenix, the only rapid reactor on a commercial scale being built in the world, which, according to the timetable, will be ready in 1984. NIRA, the firm that will be supplying the sodium circuits to Brazil, is a member of that consortium.

The lengthy text released to the press yesterday by CNEN to explain the accord points out that, "One feature of the rapid reactors lies in their ability to generate power while at the same time also producing more fuel than they consume." And it adds: "The uranium stocks already burned by the reactors in the United Kingdom amount to about 20,000 tons. If used in the rapid reactors, this volume would become equivalent to 40 billion tons of coal; in other words, 400 years of coal mining in the United Kingdom itself. In France, the current program for thermal powerplants will accumulate 250,000 tons of depleted uranium by the year 2000, representing an accumulation of energy greater than all the oil reserves in the free world." Thus, in its text, CNEN optimistically concludes that, during the 1980's, the commercial problems relating to rapid reactors will be solved, and they will be introduced on a large scale. But it was CNEN itself which published a chart showing that, of the eight countries developing the "fast-breeder" technology, only two plan to develop the reactor on a commercial scale: the United Kingdom, whose plant is only in the design stage; and France, with its Super-Phoenix. The other countries, even the Soviet Union and the United States, are confining themselves to experimental projects.

The accord with Italy is being signed at a time when doubts are recurring about the continuity of the accord already signed with Germany. The minister of energy and mines recently announced that only one plant would be constructed in Peruibe, Sao Paulo, instead of two, as scheduled. The day before yesterday, he corrected his previous statements.

2909
CSO: 5100/2301

NUCLEBRAS PRESIDENT NAMES SOUTHEAST AS POSSIBLE SITE OF SIX PLANTS

Rio de Janeiro JORNAL DO BRASIL in Portuguese 4 Aug 81 p 17

[Text] The six nuclear powerplants out of the eight in Brazil's accord with Germany that Brazil intends to construct by 1995 may be located in the southeast region. Sao Paulo, in particular, must have "more plants" in addition to the two planned on the Perube coast, because "the water resources available in the area will be depleted in the next 15 years." And if the Itaipu plant does not start operating in 1983, there will be rationing of electric power. Two of the plants in the accord are being built in Angra dos Reis.

This information comes from the president of NUCLEBRAS [Brazilian Nuclear Corporations], Ambassador Paulo Nogueira Batista. He admits the creation by the government of a new power company in Sao Paulo to operate the plants, in the event that CESP [Sao Paulo Power Company] does not consent promptly to run them and pay for them in 10 years. He also thinks that, in such an event, "Furnas could manage them."

Economic Crisis

According to the ambassador, the nuclear energy requirements cannot be gaged by the latest figures on energy consumption in the southeast region. Based on those numbers, by the end of this year the consumption will increase between 7 and 8 percent, as opposed to the 10.5 percent called for in ELETROBRAS' [Brazilian Electric Power Companies, Inc] Plan 95 for the decade.

He claims: "Brazil will not continue with this economic crisis, which is also a world crisis." Hence, with the depletion of its water resources, the country will need thermal supplementation. And, in such an instance, this would be done with nuclear power, because, "we must prepare the country for when the nuclear powerplants assume a preeminent role at the turn of the century."

The ambassador announced that the minister of mines and energy, Cesar Cals, was "mistaken" when he said that Sao Paulo would have only one nuclear powerplant next year (the minister made that statement to JORNAL DO BRASIL on 21 July, and reaffirmed it the next day at the War College). The president of NUCLEBRAS maintained that two nuclear powerplants will be built in Sao Paulo. For this purpose, NUCLEBRAS has already begun the preliminary geological studies on the site covering 230 square kilometers, where the plants will be constructed. He said that the construction work is due to begin between 1983 and 1984.

Regarding the cancellation of the contract with Norberto Odebrecht for the construction of Plant 3 at Angra dos Reis, the NUCLEBRAS president said that, this week, a notice would be published inviting construction firms to participate in the competitive bidding. He claimed that "it is not planned to have Norberto Odebrecht participate in the bidding," but the ambassador did not preclude the possibility of its entering the bidding for the two Sao Paulo plants.

He also reported that the winning firm in the bidding will have the same type of foreign technical assistance given to Norberto Odebrecht for the construction of Plant 2 at Angra dos Reis. As for the renegotiation of the contract for that plant, the president of NUCLEBRAS said that one of the changes is the conversion of the administration contract into a mere job contract.

Prices

Mr Paulo Nogueira reconfirmed the fact that the average price of the installed kilowatt in the Angra 2 and 3 plants will be $1,500 (direct cost), and the indirect cost will be $2,070. In the indirect costs, 38 percent will be added to the value of the plant.

He also stated that the participation of foreign capital in the construction of Plant 2 will be 70 percent in equipment, representing 50 percent of the total value of the unit. He thinks that this plant will prove to be cheaper than Plant 1 at Angra dos Reis, whose installed kilowatt currently costs $1,600.

He claims that the lower price is due mainly to the new type of contract for the construction of the plants that will be adopted by NUCON, a subsidiary of NUCLEBRAS: management and commitments regarding terms and prices for delivery of the projects; something which "will be happening for the first time in Brazil in projects of this kind."

The NUCLEBRAS president reaffirmed the fact that eight nuclear powerplants will be built in the country, and that the purchase of the equipment will be made in Germany on a decreasing scale. For example, Angra 2 and 3 of Angra dos Reis will have a nationalization index of 30 percent, and Nos 4 and 5 in Sao Paulo will have one of 55 percent.

In addition, he reported that the plants would be financed 100 percent by the government, and that the Brazilian Nuclear Program, including the purchase of the fuel cycle, would cost the nation $18 billion. The cycle will be complete in 1986.

Government Bears Cost of Nuclear Energy

In announcing that the water resources in the southeast region will be depleted by 1995, something which would warrant the construction of six nuclear powerplants (of the eight in the German-Brazilian accord), Ambassador Paulo Nogueira Batista, president of NUCLEBRAS, admitted that the government would be providing 100 percent of the financing for the construction of the nuclear units.

And there are some reasons for the government to bear the cost of the nuclear onus: the debt of the electric power companies, and the accumulation of projects by some of them, especially CESP [Sao Paulo Power Company].

The latter company, for example, has an investment of 60 billion cruzeiros for five new hydroelectric powerplants alone, and will increase its current 8,292 MW to 12,500, raising its capacity by over 50 percent. The new plants are: Porto Primavera, Rosana, Taquarucu, Nova Avanhandava and Tres Irmaos.

CESP, through Paulipetro, a consortium formed with IPT [Technological Research Institute], is also seeking oil in the Parana Basin. For this purpose, it signed 62 contracts for the providing of service, with a total price of over 26 billion cruzeiros.

As for Furnas, its market for electric power in the southeast and west-central regions showed a growth of 10 percent, which is 12 percent less than that recorded in 1979, according to its 1980 report, "owing to the slighter increment in industrial consumption." Furnas' participation in this market was 32 percent, less than that of the previous year, as a result of the 3 percent reduction due to the good hydrological conditions in the south and southeast regions.

Furnas is without doubt the most debt-ridden firm in the energy sector. Internally, it owes 62.4 billion cruzeiros and, externally, 133.8 billion cruzeiros, making a total of 196.2 billion cruzeiros. In 1980, the return on Furnas' investment amounted to 9.6 percent, a total of 150 million cruzeiros, an insufficient profit considering the minimal legal return of 10 percent.

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BRAZIL

BRIEFS

PROPOSED ENRICHED URANIUM PLANT--Brasilia--Yesterday, the minister of mines and energy, Cesar Cals, disclosed that he has submitted a plan to the government for the construction of a nuclear complex in Ceara, intended basically to export enriched uranium. The complex would include a uranium concentration plant, an enrichment plant and, to feed them, a nuclear electric plant. Minister Cals thinks that, since Ceara has in the Itataia region the largest Brazilian uranium deposit and one of the largest in the world, it is only natural to build that complex there. He said that a phosphoric acid concentration plant, also to be constructed on the site, will make use of the phosphate which occurs in association with the uranium ore, and will help to make the deposit economically feasible. In his arguments on behalf of the Ceara project, the minister explained that the construction of a 1.3 million kilowatt nuclear unit as part of the eight plants imported from the Federal Republic of Germany is justified not only by the anticipated consumption in the nuclear complex (the process adopted by Brazil for uranium enrichment is, of the three that are known, the one consuming the most electric power), but also by the fact that Fortaleza is the peak location of the CHESF (Sao Francisco Hydroelectric Company) transmission system, and a large-sized plant on the site would help to stabilize the line. He explained that, once the uranium concentrate has been produced for export, it would be only logical to carry out the other phases (conversion of the concentrate into uranium hexafluoride and its enrichment) locally as well, to export a richer raw material with high value on the international market. [Text] [Rio de Janeiro JORNAL DO BRASIL in Portuguese 5 Aug 81 p 17] 2909

CSO: 5100/2301

NIGER

URANIUM EXPORTS FOR FIRST 6 MONTHS GIVEN

AB272043 Paris AFP in French 0859 GMT 27 Aug 81

[Excerpts] Niamey, 27 Aug (AFP)--According to the Official Gazette of the Republic of Niger, uranium export during the first 6 months of 1981 amounted to 4,846.9 tons ready for delivery to six countries during the year.

France is Niger's biggest customer with a total of 2,953.3 tons (notices dated 3 and 7 March) followed by Libya which imports 1,212 tons, Japan with 816 tons, Spain (300 tons), FRG (125 tons) and Iraq (100 tons).

Out of these six customers, four hold shares, through their affiliates in Niger's two uranium mining companies: SOMAIR (Open Cast Mining Company) and COMINAK (Akouta Mining Company).

With SOMAIR, Niger's partners are the following countries: France, (Nuclear Materials Company--26.9 percent; the French Uranium Company--11.7 percent; Minatone--7.5 percent; and Roiokta Company--7.5 percent); FRG (Uranggesselschaft--6.3 percent); Italy (AGIP Nuclear--6.5 percent).

In COMINAK, besides Onarem Company, the following countries are shareholders: France (COGEMA--34 percent), Japan (Overseas Uranium Resources Development--25 percent) and Spain (Empresa Nacional de Uranio--10 percent).

Thus, only two countries which have no capital shares in the two Niger uranium mining companies--Libya and Iraq--imported Niger uranium in 1981, through Onarem.

Analysis of the facts contained in the Official Gazette of the Republic of Niger shows that this is the first time that Iraq has bought uranium from Niger (Notice of 28 January 1981). However, Libya previously made purchases in 1978 (258 tons), in 1979 (150 tons) and in 1980 (180 tons). This, however, the first time that Libya which does not have processing facilities, has bought such a large amount of raw uranium (1,212 tons), economic observers stated.

The French imports (2,293.3 tons) also showed a net increase compared to 1979 (100 tons) and 1980 (1,344.3 tons). Japanese and Spanish imports have remained at the same level compared to the 2 previous years, while the FRG has reduced it needs by half between 1980 (250 tons) and 1981 (125 tons).

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NUCLEAR CAPABILITY'S VALUE TO COUNTRY'S STATUS DISCUSSED

London WEST AFRICA in English No 3339, 27 Jul 81 pp 1685-1687

[Article by Dr Stephen Wright, Department of Political Science, University of Sokoto: "Limits of Nigeria's Power Overseas"]

[Excerpt]

The final issue to discuss in this brief survey concerns the debate within the country over whether or not to "go nuclear". *The Punch* of July 2 reported that the Ministry of Mines and Power had finally decided to go ahead with the nuclear programme using ₦10m. earmarked by the Federal Government for initial research and development. The debate over a nuclear programme has generated some controversy, but the majority of people appear to favour such a plan. Stripped to its crudest form, the logic is that Nigeria is a leading power, and as all leading powers by definition should be nuclear, so Nigeria should also go nuclear. There is also, of course, the military dimension. Neither the former Head of State, General Olusegun Obasanjo, nor President Shagari have bothered with normal diplomatic niceties, but have stated explicitly that Nigeria wants nuclear military firepower to combat and neutralise the nuclear weaponry of South Africa.

The possession of a nuclear capability may do much to raise the strength and bargaining position of Nigeria within Africa and the world as a whole, but there are many drawbacks which should be noted. The issue of "statues versus power" is again important, because possession of nuclear weapons, while conferring status, does not automatically give power. It is unlikely, for example, that relations with Britain or the US would change if Nigeria possessed nuclear weaponry, and yet it is through these relations that Nigeria's underdevelopment condition is maintained. Would Nigeria threaten a nuclear attack on the US or Britain or France?

If one turns to look at Nigerian-South African relations, then some intriguing questions arise. Possession of nuclear weapons of Nigeria is regarded as a way to deal with the obnoxious regime, but the realities of this should be considered. For anyone with any doubts concerning the limits to which the black sheep of the international community — South Africa and Israel — will go to maintain their survival, the Israeli destruction of Baghdad's nuclear reactor provides a useful lesson. If Nigeria's nuclear programme is specifically to fight South Africa, why should the apartheid regime not employ a similar tactic?

If one accepts the assumption that Nigeria will get to the stage of producing nuclear weapons — and whichever country supplies the technology and the enriched uranium will have to do some diplomatic somersaults to ignore the Non-Proliferation Treaty — there is the question of what type of weapon to produce. At present, there is rather a simplistic view that *the bomb* — a *deus ex machina* — is all that is needed and there is little thought as to its sophistication, delivery or power.

To take just one issue — though a crucial one — of the type of weapon, it is important to consider the implications of having tactical or strategic nuclear weapons. If Nigeria were to build tactical or smaller, weapons, then these would probably have to be located somewhere in the front-line states. It is fairly safe to predict that none of the front-line states would want nuclear weapons based on their soil for fear of retaliation by South Africa, or for fear of nuclear devastation.

The possession of strategic nuclear missiles based in Nigeria and trained on South Africa presents an equally difficult problem. What has generally been ignored is the fundamental fact that South Africa is not a white country, but a black country, where non-whites constitute around 80 per cent of the population. If a future nuclear confrontation were to arise, would any Nigerian President risk the destruction not only of Nigeria, but also of the very people in South Africa whom he is supposed to be liberating? Such a question may not prevent Nigeria from going nuclear, but may well affect the credibility of its future nuclear policy.

In conclusion, it is necessary to state that the aim here has not been to paint too bleak a picture of the constraints and limitation on Nigerian foreign policy, because it is evident that the country does play a major role in the international system. The aim, however, has been to point to some of the factors responsible for the apparent lack of success in foreign policy. No real distinction has been made between the Obasanjo and Shagari administrations in the field of foreign policy because, in broad terms, none exists. If anything, the problems facing the Shagari government are greater because of the increasingly unfavourable external environment, as well as the domestic pressures from the competitive and volatile party system. Given these increased constraints, it is even more imperative to define and reorientate Nigerian foreign policy in order to attempt to match rhetoric with action.

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BRIEFS

DENMARK PLAN IF SWEDISH N-ACCIDENT--Six years after the start of the Barsebak plant a real alarm system has now been set up for the Danish public in the event of a serious nuclear power accident. The catastrophe signal will be sent out by the "Wednesday siren" which will issue three blasts of 12 seconds duration two times in the threatened area as a signal that everyone should go inside and turn on the radio. Civil defense sirens are set up in all larger towns and can be heard each Wednesday at noon during the weekly test blast. The people who live outside the areas covered by the sirens will be alerted by loudspeakers in police cars. The alarm arrangements were worked out by the Civil Defense Agency in co-operation with Danish Radio, the police and environmental and health agencies. The total revision of the emergency plan dating from the mid-1970's will come out later. Currently the Environmental Agency's proposed revision is awaiting the approval of the Ministry of Environmental Affairs. [Text] [Copenhagen BERLINGSKE TIDENDE in Danish 31 Jul 81 p 2] 6578

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NUCLEAR COOPERATION WITH LIBYA, OTHER ARAB COUNTRIES

Brussels LE SOIR in French 8 Aug 81 p 2

[Article by Guy Duplat: "Possible Breakthrough in Belgian Nuclear Cooperation with Arab Countries"]

[Text] Belgian engineers have completed a safety study of a Russian nuclear reactor that may be purchased by Libya! And Belgium has high hopes that Libya will continue to use its services to help that North African country expand its civilian nuclear power program.

These somewhat surprising contracts must be viewed within the context of the worldwide effort which Belgatom, a Belgium firm, is making to market nuclear power technology. For purposes of foreign contracts, Belgatom is a consortium of three Belgian companies: Belgonucleaire, Electrobel, and Traction-Electricite.

Relatively large contracts have already been received from Taiwan and South Korea, the latter for 1 year's intensive training of Korean nuclear technicians. But Belgatom also entertains earnest hopes of obtaining contracts from Arab countries. The latter are rightly concerned about preparing themselves for the "post-oil" era and are, therefore, seriously thinking of initiating large-scale civilian nuclear power programs.

An Algerian mission visited Belgium recently and it is hoped that an initial contract may be signed in September for reportedly the study of a possible nuclear power plant site in Algeria. We also know that Belgatom is a favorable position to have the Syrian Government accept its bid on a general feasibility study of Syria's electric power system. Furthermore, Belgonucleaire has a contract for the restart-up of a Turkish reactor.

The best chance for contracts could, however, be with the Libyan Government.

Belgonucleaire has had a long-standing open-end technical consultant contract with the Libyan Atomic Commission. Under this contract, Belgian technicians advised their Libyan counterparts--most of whom were trained in the United States, France, and Germany--on the choice of Libya's first nuclear research reactor. Libya chose a Russian reactor and construction of the research center at Tajura--similar to our research center at Mol--is nearing completion. Belgian engineers have been consulted on this project many times. Belgonucleaire's open-end contract was transferred to Belgatom when Belgonucleaire joined that industrial group 3 years ago.

For several years, Libya has wanted to advance into a new phase of its nuclear power program by ordering a nuclear power plant generating electricity to be used for the desalination of sea water, thereby supplying essential water for the irrigation of fertile but dry Libyan lands.

Libya first approached Western countries about such a plant. Though they were prepared to furnish the power plant, these countries did not wish to enter into long-term contracts for supplying nuclear fuel, and this for obvious political reasons. The Russians, however, lost no time in accepting this clause. The Russians proposed a 400-megawatt power plant of the same type as one they had already built in Finland and were to install in Syria.

Press Made Finns Lose Contract

The Libyans wanted to assure themselves that the Russian plant met those safety standards regularly maintained in Western countries. They therefore, thought of the Finns who already had had a Russian plant and an American plant built in their country and, therefore, seemed to be in the best position to make this safety analysis of the future Russian power plant.

The Finnish press got wind of this, made a stir about it, and merely succeeded in scaring off the Libyans. The latter then turned to the Belgians who had been their faithful advisers for years.

Exclusively Peaceful Use

This first safety study has been completed. It is but a preliminary analysis inasmuch as the Russian-Libyan contract has still not been signed. Some 12 Belgian engineers worked more than a year on the study. These engineers form part of the teams building the Doel and Tihange nuclear power stations. In that capacity, their work is inspected by the regulatory agency Vincotte. But for the purposes of this Libyan contract, instead of being subject to inspection, these engineers have themselves become the inspectors!

This safety analysis is very preliminary also because the Russians have supplied the data absolutely necessary for such a study in merely dribs and drabs.

This first small Belgian-Libyan contract could lead to others in coming months and the Belgians still hope to receive much larger contracts once purchase of the Russian power plant is confirmed.

The Belgians are, of course, cautious about such contracts. They realize that nuclear contracts with Arab countries are a ticklish matter since the bombing of the Iraqi reactor or because of such fanciful and baseless novels as the "Fifth Horseman." Belgatom does, of course, request authorization from the Ministry of Foreign Affairs before negotiating any nuclear contract. It also rigorously complies with the export ban on any technology or information having to do with uranium enrichment, irradiated fuel reprocessing or plutonium processing, all products that could lead to nuclear weapons proliferation. All approved nuclear contracts are, therefore, exclusively for peaceful use.

Furthermore, Belgium deals solely with countries that permit the International Atomic Energy Agency in Vienna to inspect their nuclear installations. Libya does grant that agency such access. Fully complying with the agency's safeguards and restrictions, the highly competent Belgian nuclear industry must of necessity expand into foreign markets if it does not want its business to go to seed.

These same Belgian "nuclear" firms do, however, provide other services. For example, Belgonucleaire has been awarded a contract for the installation of a small 10-kilowatt solar power station in Borj Sedria, Tunisia. Admittedly this is a small contract, but it can serve as a pilot project. Moreover, it is of interest to other Belgian firms inasmuch as IDE, the Walloon solar panel company, has been able to sell the Tunisians a license for its panels.

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